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(56) References cited:
GB-A- 1 446 130
GB-A- 2 062 789
GB-A- 2 119 046
US-A- 2 077 584
US-A- 3 065 885
US-A- 3 645 562
US-A- 4 647 008
US-A- 4 711 265
US-A- 4 756 558

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Description

Technical Field

The present invention relates generally to locking mechanisms for demountably attaching one article to another. More particularly, the present invention relates to a secure locking mechanism that can demountably attach one article to another without the use of screws or other similarly essential, but separate, mounting means as specified in the preamble of claim 1, for example as disclosed in US-A-2,077,584. Specifically, the present invention relates to a locking mechanism that is particularly adapted for demountably securing a solenoid valve assembly to the housing of an electronically-controlled automotive transmission.

Background of the Invention

As is well-known to the art, electronically-controlled automotive transmissions are distinguished by the fact that the flow and pressure control valves which monitor, and selectively direct, hydraulic fluid to the various control mechanisms of the transmission are actuated by solenoids. Individual solenoids and individual valves are often conjoined as a unitary assembly. Such unitary solenoid valve assemblies are generally employed: (1) to control the main fluid pressure within the transmission, (2) to establish the shift pressure for the transmission, as well as (3) to monitor the engine torque to establish the throttle position pressure, and direct fluid pressure to or from the shift control valves.

Historically, the solenoid valve assemblies have been secured to the transmission housing by a plurality of individual fastening means. The transmission housing may include a separate control housing to which the solenoids are secured. Typically, the solenoid valve assemblies have been secured by snap-rings, machine screws, or the like. Such mounting devices either secure a mounting flange presented from the solenoid frame to the transmission housing or secure a separate cap member which performs the functions of enclosing the solenoid to protect it from potentially deleterious exposure to the environment while simultaneously capturing and securing it in operative position on the transmission housing.

Such arrangements are, at best, time-consuming and tedious to install and require a multitude of individual parts that are easily misplaced or lost.

Summary of the Invention

A locking mechanism for demountably securing a solenoid valve assembly within a receptacle in the wall of a transmission housing according to the present invention is characterised by the features specified in the characterising portion of claim 1.

It is, therefore, a primary object of the present invention to provide an improved locking mechanism which can be readily and easily employed demountably to secure a solenoid valve assembly to the housing of an electronically-controlled automotive transmission.

It is another object of the present invention to provide a locking mechanism, as above, a portion of which is relatively permanently secured to the solenoid valve assembly and the remaining portion of which is relatively permanently secured to the transmission housing so that the two portions of the locking mechanism can co-operatively interact demountably to secure a solenoid valve assembly to a transmission housing without the need to resort to the use of essential but separate components that can be misplaced or lost.

These and other objects of the invention, as well as the advantages thereof over existing and prior-art forms, which will be apparent in view of the following detailed specification, are accomplished by means hereinafter described and claimed.

In general, a locking mechanism embodying the concepts of the present invention is adapted demountably to secure a solenoid valve assembly within a receptacle in the wall of a transmission housing. A retention means is relatively permanently secured to the solenoid valve assembly, and a stop means is presented from the retention means. A first blocking face is presented from the transmission housing to be engaged by the stop means and thereby to limit the angular range through which the solenoid valve assembly may be rotated within the receptacle.

The retention means also presents an engaging surface, and a second blocking face is presented from the transmission housing. The engaging surface is disposed in opposition to the second blocking face in order to preclude withdrawal of the solenoid valve assembly from the receptacle when the stop means engages the first blocking face.

Finally, a latching means is presented from the retention means, and a third blocking face is presented from the transmission housing. Engagement, or opposition, of the latching means with the third blocking face normally precludes retro-rotation of the solenoid valve assembly within the receptacle when the stop means engages the first blocking face.

A biasing means permits selective displacement of at least the latching means out of operative engagement with all blocking surfaces: (1) to permit that rotation of the solenoid valve assembly within the receptacle which transports the engaging

surface presented from the retention means into opposition with the second blocking face in order to preclude withdrawal of the solenoid valve assembly from the receptacle, and conversely (2) to permit retro-rotation of the retention means within the receptacle which transports the engaging surface out of opposition with the second blocking surface in order to permit withdrawal of the solenoid valve assembly from the receptacle.

The structural configuration of one exemplary configuration of a locking mechanism, and a modification thereof, both embodying the concepts of the present invention, are shown by way of example in the accompanying drawings and are described in detail without attempting to show all of the various forms and modifications in which the invention might be embodied; the invention being covered by the appended claims and not being limited by the specific details of the specification and drawings.

Brief Description of the Drawings

Figure 1 is a side, elevational view of an exemplary embodiment for a locking mechanism embodying the concepts of the present invention and employed demountably to secure a solenoid valve assembly, also depicted in side elevation, within a receptacle in the wall of a transmission housing, that portion of the transmission housing which comprises a portion of the locking mechanism being represented in side elevation with the remaining portion of the transmission housing that is depicted being represented in section;

Figure 2 is an end, elevational view of the embodiment shown in Figure 1;

Figure 3 is an enlarged, cross-sectional view taken substantially along line 3-3 of Figure 2 to depict the relationship between that portion of the locking mechanism carried on the solenoid valve assembly as it co-operatively interacts with that portion of the locking mechanism presented from the transmission housing to secure the solenoid valve assembly within the receptacle;

Figure 4 is an exploded perspective view of that portion of the retention means presented from the solenoid valve assembly and employed in that form of the invention depicted in Figures 1-3 and comprising a locating member and a latching member;

Figure 5 is a view similar to Figure 2, though enlarged, depicting an alternative form of a locking mechanism embodying the concepts of the present invention;

Figure 6 is a further enlarged section taken substantially along line 6-6 of Figure 5 to depict the relationship between that portion of the locking mechanism carried on the solenoid valve assembly as it co-operatively interacts with that portion of the locking mechanism presented from the transmission housing to secure the solenoid valve assembly within the receptacle; and,

Figure 7 is a side, elevational view, partly in section, of the alternative embodiment depicted in Figures 5 and 6 employed demountably to secure a solenoid valve assembly, also depicted in side elevation, within a receptacle in a transmission housing.

Description of an Exemplary Embodiment

One representative form of a locking mechanism embodying the concepts of the present invention is depicted in Figures 1-4 of the accompanying drawings and is designated generally by the numeral 10 thereon. Although the locking mechanism 10 may be adapted for use in other environments, the locking mechanism 10 has particular suitability for demountably securing solenoid valve assemblies to the walls of electrically-controlled transmission housings.

As best depicted in Figure 1, a wall 11 of a transmission housing 12 is provided with a stepped receptacle 13 adapted operatively to receive a solenoid valve assembly 14. The stepped receptacle 13 presents a central aperture 15 within which a valve mechanism -- indicated generally by the numeral 16, and forming a part of the solenoid valve assembly 14 -- is operatively received. The details of the valve mechanism 16 and its co-operative interaction with the various passages within the wall 11, a typical example of which is designated at 18, form no part of the present invention and are, in fact, so well-known to the art that they are not described herein.

A recess 20 concentrically circumscribes the central aperture 15 to receive a neck portion 21 on a valve housing 22 of the solenoid assembly 14. Solenoid 23 itself is secured to the valve housing 22 by means well-known to the art and will not, therefore, be described herein.

One or more pillars 25 are presented from the transmission housing 11, and the pillars 25 comprise a principal portion of the locking mechanism.

In the detailed description which follows, a particular structural member, component or arrangement may be employed at more than one location. When referring generally to that type of structural member, component or arrangement a common numerical designation shall be employed. However, when one of the structural members, components or arrangements so identified is to be individually identified, or referenced, it shall be designated by

virtue of a letter suffix employed in combination with the numerical designation employed for general identification of that structural member, component or arrangement. Thus, there are at least two pillars which are generally identified by the numeral 25, but the specific, individual pillars are, therefore, identified as 25A and 25B in the specification and on the drawings. This same suffix convention shall be employed throughout the specification.

Continuing, then, with the detailed description of the invention, for most installations a pair of pillars 25A and 25B may be disposed in diametric opposition relative to the recess 20. As depicted in Figure 1, each pillar 25 has a pedestal portion 26 which is integrally formed with, and extends outwardly from, the wall 11 of the transmission housing 12 to terminate in an integral head portion 30 that is disposed in spaced relation outwardly from the wall 11 of the transmission housing 12. The head portions 30A and 30B of the respective pillars 25A and 25B preferably extend toward each other from their respective supporting pedestal portions 26A and 26B.

Each head portion 30 presents three blocking faces. The first blocking face 31 comprises one lateral wall of the head portion 30. The second blocking face 32 on each head portion 30 comprises the obverse wall thereof, and as such the second blocking face 32 opposingly faces the wall 11 of the transmission housing 12. The third blocking face 33 also comprises one lateral wall of the head portion 30. The third blocking face 33 is thus laterally spaced with respect to the first blocking face 31, and the first and third blocking faces 31 and 33, respectively, are thus disposed substantially perpendicularly with respect to the second blocking face 32.

A retention means 35, which also comprises a principal portion of the locking mechanism 10, is preferably secured within the solenoid valve assembly 14 in a relatively permanent manner. In the embodiment of the locking mechanism 10 depicted in Figures 1-4 the retention means 35 comprises a plate-like locating member 36 and a separate latching member 38.

As best depicted in Figure 4, the locating member 36 has a hub portion 39 which is notched, as at 40, to permit assembly within the solenoid valve assembly 14. In the alternative, the notch 40 can be replaced with a simple aperture. Bores 41 which penetrate the hub portion 39 of the locating member 36 are used to assure accurate radial location within the solenoid valve assembly 14.

When secured within the solenoid valve assembly 14, diametrically-opposed arms 42A and 42B on the locating member 36 extend radially outwards relative to the solenoid frame 22 to present engaging surfaces 43A and 43B in proximity to the radially outer extremity of each arm 42A and 42B, respectively. The engaging surfaces 43A and 43B can, by selective rotation of the solenoid valve assembly 14 with the locating member 36 secured thereto, be selectively disposed in opposing juxtaposition with respect to the corresponding second blocking faces 32A and 32B on the head portions 30A and 30B of the pillar means 25A and 25B, respectively.

A stop lug 45 extends perpendicularly outwardly from one lateral edge of each engaging surface 43A and 43B on the locating member 36. Engagement of the stop lug 45A with the first blocking face 31A on the head portion 30A of pillar means 25A simultaneously with engagement of the stop lug 45B with the first blocking face 31B on the head portion 30B of pillar means 25B determines the extent to which the locating member 36 can be rotated, in one direction, when the solenoid valve assembly 14 is received within the receptacle 13. As viewed in Figures 2 and 4, the stop lugs 45A and 45B are located on the diagonally opposite edges of the engaging surfaces 43A and 43B, respectively, and when disposed as depicted the lugs 45 determine the extent to which the solenoid valve assembly 14 can be rotated (in a clockwise direction as viewed).

The latching member 38 is likewise disposed transversely relatively to the valve housing 22, and the latching member 38 is also preferably secured within the solenoid valve assembly 14 in a relatively permanent manner. Specifically, the latching member 38, as best depicted in Figure 4, has a hub portion 46 which has a suitable aperture 48 therein to accommodate assembly. Bores 49 which penetrate the hub portion 46 of the latching member 38 are used to assure accurate radial location within the solenoid valve assembly 14. When secured to the solenoid assembly 14, diametrically-opposed fingers 50A and 50B on the latching member 38 extend radially outwards relative to the valve housing 22.

Each finger 50 comprises a cantilevered spring which terminates in a latching dog 55 which extends perpendicularly outwards from the radially outermost extremity of each finger 50 selectively, and operably, to interact with the third blocking face 33 on the head portion 30 of each pillar 25 to prevent retro-rotation of the solenoid assembly 14 when the latching dog 55 has operably engaged the third blocking face 33.

In order to effect automatic locking and to facilitate unlocking, the latching dogs 55 must be capable of being displaced out of operative engagement with each blocking face 32, 32 and 33 on the head portion 30 of the appropriate pillar 25. In the embodiment depicted in Figures 1-4 the biasing action of at least one spring finger 50 not

only urges the latching dog 55 carried thereon into operative, locking interaction with the third blocking face 33 on the head portion 30 of the appropriate pillar 25 but also permits the required selective displacement of the latching dog 55 necessary to move the latching dog 55 out of operative engagement with the first and third blocking faces 31 and 33, respectively, on the head portion 30 of each such pillar 25.

To effect the required displacement of the latching dogs 55 when the solenoid assembly 14 is rotated to actuate the locking mechanism 10, a camming ramp 56 is incorporated as the leading edge on each latching dog 55. The camming ramps 56 are disposed so that rotation (clockwise as viewed in Figure 2) of the solenoid frame 22 drives the camming ramp 56 against a striker edge 58 which defines the intersection between the first and second blocking faces 31 and 32, respectively, on the head portion 30 of each pillar 25. Continued rotation of the solenoid frame 22 displaces each latching dog 55 so that it may pass beneath the second blocking face 32 on the head portion 30 of each pillar 25. An apex 59 of the latching dog 55 will slide across the second blocking face 32, but such contact does not impair rotation of the solenoid valve assembly 14.

When the stop lugs 45A and 45B engage the first blocking faces 31A and 31B on the head portions 30A and 30B of the appropriate pillars 25A and 25B, the biasing action of the fingers 50A and 50B urges the latching dogs 55A and 55B to move so that blocking surfaces incorporated as trailing edges 60A and 60B on the latching dogs 55A and 55B opposingly interact with the respective third blocking faces 33A and 33B. As best seen in Figure 3, the trailing edge 60A of the latching dog 55A is angularly inclined. Were both the trailing edges 60 disposed perpendicularly with respect to the fingers 50, the trailing edges 60 would engage the third blocking face 33 on each pillar 25 to preclude retro-rotation of the solenoid valve assembly 14. However, when the trailing edges 60 are each inclined, as depicted by the trailing edge 60A in Figure 3, they will each engage the third blocking face 33 at its intersection with the second blocking face 32. As such, the inclination of the trailing edge 60 must be such that it cannot serve as a cam. This is imperative inasmuch as the purpose of the latching dog 55 is to preclude retro-rotation of the solenoid valve assembly 14 when the latching dog 55 operatively interacts with any part of the third blocking face 33, including just that portion of the third blocking face 33 which intersects the second blocking face 32 and to maintain contact between stop lugs 45 and blocking faces 31. As an alternative structure, one of the trailing edges; i.e., 60A, can be disposed perpendicular with respect to the fingers 50 and thereby provide a positive retention structure.

In order to effect removal of the solenoid valve assembly 14 it is necessary that the latching dogs 55 be capable of being selectively displaced operatively to disengage from the appropriate third blocking face 33. By mounting each latching dog 55 on the outboard end of cantilevered spring finger 50 one may selectively displace the latching dogs 55 out of operative interaction with the third blocking faces 33 so that the solenoid valve assembly 14 may be retro-rotated. Certainly as the solenoid valve assembly 14 is retro-rotated, the apex 59 on each latching dog 55 will slide across one of the second blocking faces 32, but that contact will not preclude retro-rotation of the solenoid valve assembly 14, and once the engaging surfaces 43, and the latching dogs 55, clear the second blocking faces 32, the solenoid valve assembly 14 may be withdrawn from the receptacle 13.

Alternative Embodiment

Referring now to Figures 5-7 an alternative embodiment of the locking mechanism of the invention, shown as locking mechanism 110, is depicted. As best depicted in Figure 7, a wall 111 of a transmission housing 112 is provided with a stepped receptacle 113 adapted operatively to receive a solenoid valve assembly 114. The stepped receptacle 113 presents a central aperture 115 within which a valve mechanism --indicated generally by the numeral 116, and forming a part of the solenoid valve assembly 114 -- is operatively received. As with the first embodiment described herein, the details of the valve mechanism 116 and its co-operative interaction with the interior of the transmission housing 112 as well as with various passages (not shown) situated within the wall 111 form no part of the present invention and, in fact, are so well-known to the art that they are not described herein.

A recess 120 concentrically circumscribes the central aperture 115 to receive a neck portion 121 on valve housing 122 of the solenoid assembly 114. The solenoid 123 itself is secured within the housing 122 by means well-known to the art and will not, therefore, be described herein.

As with the previously described embodiment, one or more pillars 125 are presented from the wall 111 of the transmission housing 112, and the pillars 125 also comprise a principal portion of the locking mechanism 110.

For most installations, pillars 125A and 125B are disposed in diametric opposition to one another relative to the receptacle 113. Each pillar 125A and 125B has a pedestal portion 126 which extends

outwardly from the wall 111 of the transmission housing 112 to terminate in a head portion 130 that is disposed in spaced relation outwardly from the wall 111 of the transmission housing 112.

The head portions 130A and 130B of the respective pillars 125A and 125B preferably extend towards each other from their respective supporting pedestal portions 126A and 126B.

Each head portion 130 presents three blocking faces. The first blocking face 131 comprises one lateral wall of the head portion 130. The second blocking face 132 on each head portion 130 comprises the obverse wall thereof, and as such the second blocking face 132 opposingly faces the wall 111 of the transmission housing 112. The third blocking face 133 also comprises one lateral wall of the head portion 130. The third blocking face 133 is thus laterally spaced with respect to the first blocking face 131 and the first and third blocking faces 131 and 133, respectively, are thus disposed substantially perpendicularly with respect to the second blocking face 132.

A retention means 135, which comprises a principal portion of the locking mechanism 110, is preferably secured within the solenoid valve assembly 114 in a relatively permanent manner. In the embodiment of the locking mechanism 110 depicted in Figures 5-7 the retention means 135 comprises a single locking member 137 and a spring 157.

The locking member 137 has a hub portion 139 which is provided with a suitable opening (not shown) to permit assembly within the solenoid valve assembly 114.

When secured within the solenoid assembly 114, diametrically-opposed arms 142A and 142B on the locking member 137 extend radially outwards relative to the valve housing 122 to present engaging surfaces 143A and 143B in proximity to the radially outer extremity of each arm 142A and 142B, respectively. The engaging surfaces 143A and 143B can, by selective rotation of the solenoid valve assembly 114 with the locking member 137 secured thereto, be selectively disposed in opposing juxtaposition with respect to the second blocking faces 132A and 132B on the head portions 130A and 130B of the respective pillar means 125A and 125B.

Stop lugs 145A and 145B extend perpendicularly outwardly from one lateral edge of the respective engaging surfaces 143A and 143B on the locking member 137 to engage the first blocking faces 131A and 131B on the head portion 130 of each pillar means 125A and 125B and thereby determine the extent to which the solenoid valve assembly 114 can be rotated, in one direction. As viewed in FIG. 6, the stop lugs 145A and 145B are located on the diagonally opposite edges of the engaging surfaces 143A and 143B, respectively, and when disposed as depicted the lugs 145 determine the extent which the solenoid assembly 114 can be rotated in a clockwise direction.

Latching dogs 155A and 155B extend perpendicularly outwards from the opposite lateral edges of the respective engaging surfaces 143A and 143B on locking member 137. The latching dogs 155 are located in laterally-spaced relation with respect to the stop lugs 145 and thus on the opposite side of the engaging surfaces 143. Each latching dog 155 is adapted, and located, selectively to engage the third blocking face 133 on the head portion 130 of each pillar 125 to prevent retro-rotation of the solenoid assembly 114 when the latching dog 155 is disposed in opposition to the third blocking face 133.

In order to effect selective locking and unlocking of the locking mechanism 110, the latching dogs 155 must be permitted to be displaced against the biasing action of the spring 157 to allow the latching dogs 155 to pass unrestricted past the pillar means 125.

The spring 157 is received within a space 158 which circumscribes the recess 120 and is interposed between the locking member 137 and a surface 159 of the space 158 biasingly to urge the solenoid valve assembly 114 axially outwards of the receptacle 113. The opposed juxtaposition of the engaging surfaces 143 with the second blocking face 132 on the head portion 130 of each pillar 125 secures the solenoid valve assembly 114 within the receptacle 113..

In order to mount the solenoid valve assembly 114 it is necessary that the latching dogs 155 be capable of being selectively displaced operatively to clear the first blocking face 131 on each pillar 125 and permit the solenoid valve assembly 114 to be rotated until the stop lug 145 engages the first blocking face 131. Conversely, in order to effect removal of the solenoid valve assembly 114 it is also necessary that the latching dogs 155 be capable of being selectively displaced operatively to disengage from the third blocking face 33 so the solenoid valve assembly 114 may be retro-rotated sufficiently for the engaging surfaces 143 and the latching dogs 155 to clear the pillars 125. By employing the spring 157 the entire solenoid valve assembly 114 may be displaced axially inwardly a sufficient distance to displace the latching lugs 155 out of operative engagement with the head portion 130 of each pillar 125 so that the solenoid valve assembly 14 may be rotated to secure it in operative position in the receptacle or retro-rotated to effect withdrawal thereof.

Claims

1. A locking mechanism (10;110) for demountably securing an assembly (14;114) within a receptacle (13;113) in the wall (11;111) of a transmission housing (12;112), said locking mechanism (10;110) comprising a stationary locking member (25;125) engageable with a movable locking member (36,38;137) by a process of aligning the movable locking member (36,38;137) with the stationary locking member (25;125), inserting the movable locking member (36,38;137) within the stationary locking member (25;125), and then rotating the movable locking member (36,38;137) within the stationary locking member (25;125) to engage one with the other, characterised in that said stationary locking member comprises pillar means (25;125) extending from the wall (11;111) of the transmission housing (12;112) in juxtaposition to said receptacle (13,113), said pillar means (25;125) having a pedestal portion (26;126) and a head portion (30;130) which has first (31;131), second (32;132) and third (33;133) blocking faces present thereon, said first (31;131) and third (33;133) blocking faces being laterally spaced from one another with said second blocking face (32;132) being perpendicularly disposed between said first (31;131) and third (33;133) blocking faces and in spaced opposition to said receptacle (13;113); said movable locking member comprises a plate-like locking member (36,38;137) retained on a solenoid assembly (14;114), there being at least one engaging surface (43A,43B;143A,143B) present on said plate-like locking member (36,38;137), at least one stop lug (45A,45B;145A,145B) extending outwardly from said locking member (36,38;137), and at least one latching dog (55;155) extending outwardly from said locking member (36,38;137), said stop lug (45A,45B;145A,145B) and said latching dog (55,155) being laterally spaced from one another with said engaging surface (43A,43B;143A,143B) being disposed therebetween; and the locking mechanism includes biasing means (50;157) to urge said engaging surface (43A,43B;143A,143B) against said second blocking face (32,132) and to permit selective displacement of said locking member (36,38;137) so as to separate said engaging means (43A,43B;143A,143B) from said second blocking face (32;132) and thus permit selective rotation, or retro-rotation, of said locking member (36,38;137) within the receptacle so that said latching dog (55;155) passes the second blocking face of said pillar means (25;125) without substantial engagement therewith so as to permit mounting, and demounting, of the solenoid valve assembly (14;114) with respect to the receptacle (13;113).

2. A locking mechanism according to Claim 1, characterised in that said biasing means employs at least one spring finger (50A,50B); each latching dog (55A,55B) is carried on a respective spring finger (50A,50B); a camming ramp configuration (56) is provided on each latching dog (55); at least one striker edge (58) is present on the transmission housing (12); and engagement of each camming ramp configuration (56) with said striker (58) effects displacement of a respective latching dog (55) upon rotation of the solenoid assembly (14) sufficiently to permit said locking member (36,38) to clear said first (31A,31B) and second (32A,32B) blocking faces until said stop lugs (45A,45B) engage said first blocking faces (31A,31B) and said latching dogs (55A,55B) engage said third blocking faces (33A,33B).

3. A locking mechanism according to Claim 1, characterised in that said movable locking member is a locking plate (137); said stop lug (145A,145B) and said latching dog (155) extend from the plane of said locking plate (137) and are laterally spaced with respect to said engaging surface (143A,143B) and are thereby adapted to embrace said first (131) and third (133) blocking faces on said pillar means (125); and said biasing means is a spring (157), said spring (157) permitting selected translation of said rigid plate (137) relative to the receptacle (113).

Patentansprüche

1. Sperrvorrichtung (10; 110) zur abnehmbaren Befestigung einer Baugruppe (14; 114) in einer Aufnahme (13; 113) in der Wand (11; 111) eines Getriebegehäuses (12; 112), wobei die Sperrvorrichtung (10; 110) ein stationäres Sperrglied (25; 125) umfaßt, das mit einem beweglichen Sperrglied (36, 38; 137) durch einen Prozeß der Ausrichtung des beweglichen Sperrgliedes (36, 38; 137) mit dem stationären Sperrglied (25; 125) in Eingriff bringbar ist, wobei das bewegliche Sperrglied (36, 38; 137) in das stationäre Sperrglied (25; 125) eingesetzt wird, und dann das bewegliche Sperrglied (36, 38; 137) in dem stationären Sperrglied (25; 125) rotiert wird, um das eine mit dem anderen in Eingriff zu bringen,
dadurch **gekennzeichnet,**
daß das stationäre Sperrglied Holmmittel (25; 125) umfaßt, die sich von der Wand (11; 111)

des Getriebegehäuses (12; 112) in Nebeneinanderstellung zu der Aufnahme (13, 113) erstrecken, wobei die Holmmittel (25; 125) ein Fußteil (26; 126) und ein Kopfteil (30; 130) aufweisen, das erste (31; 131), zweite (32; 132) und dritte (33; 133) Blockierflächen darauf aufweist, wobei die ersten (31; 131) und dritten (33; 133) Blockierflächen seitlich mit der zweiten Blockierfläche (32; 132) voneinander beabstandet sind, die senkrecht zwischen den ersten (31; 131) und dritten (33; 133) Blockierflächen und in beabstandeter Gegenüberlage zu der Aufnahme (13; 113) angeordnet ist; wobei das bewegliche Sperrglied ein plattenähnliches Sperrglied (36, 38; 137) umfaßt, das an der Magnetspulenbaugruppe (14; 114) zurückgehalten ist, wobei wenigstens eine Eingriffsoberfläche (43A, 43B; 143A, 143B) auf dem plattenähnlichen Sperrglied (36, 38; 137) vorhanden ist, wenigstens ein Anschlagansatz (45A, 45B; 145A, 145B) sich von dem Sperrglied (36, 38; 137) nach außen erstreckt, und zumindest eine Rastklinke (55; 155) sich von dem Sperrglied (36, 38; 137) nach außen erstreckt, wobei der Anschlagansatz (45A, 45B; 145A, 145B) und die Rastklinke (55, 155) seitlich mit der dazwischen angeordneten Eingriffsoberfläche (43A, 43B; 143A, 143B) voneinander beabstandet sind; und daß die Sperrvorrichtung Vorspannmittel (50, 157) enthält, die die Eingriffsoberfläche (43A, 43B; 143A, 143B) gegen die zweite Blockierfläche (32, 132) drängen und eine selektive Verschiebung des Sperrgliedes (36, 38; 137) ermöglichen, um die Eingriffsmittel (43A, 43B; 143A, 143B) von den zweiten Blockierflächen (32; 132) zu trennen und infolgedessen eine selektive Rotation oder Rück-Rotation des Sperrgliedes (36, 38; 137) innerhalb der Aufnahme zu ermöglichen, so daß die Rastklinke (55; 155) die zweite Blockierfläche des Holmmittels (25; 125) passiert, ohne mit dieser wesentlich in Eingriff zu stehen, um das Anbringen und die Abnahme der Magnetspulenventilbaugruppe (14; 114) bezüglich der Aufnahme (13; 113) zu ermöglichen.

2. Sperrvorrichtung nach Anspruch 1, dadurch **gekennzeichnet,** daß das Vorspannmittel zumindest einen Federfinger (50A, 50B) verwendt; jede Rastklinke (55A, 55B) von einem jeweiligen Federfinger (50A, 50B) getragen ist; eine Nockenrampenausbildung (56) auf jeder Rastklinke (55) vorgesehen ist; zumindest ein Stoßrand (58) auf dem Getriebegehäuse (12) vorhanden ist; und ein Eingriff jeder Nockenrampenausbildung (56) mit dem Stoßrand (58) eine Verschiebung einer jeweiligen Rastklinke (55) bei Rotation der Magentspulenbaugruppe (14) bewirkt, die ausreichend ist, um es dem Sperrglied (36, 38) zu ermöglichen, die ersten (31A, 31B) und zweiten (32A, 32B) Blockierflächen freizugeben, bis die Anschlagansätze (45A, 45B) mit den ersten Blockierflächen (31A, 31B) in Eingriff treten und die Rastklinken (55A, 55B) mit den dritten Blockierflächen (33A, 33B) in Eingriff treten.

3. Sperrvorrichtung nach Anspruch 1, dadurch **gekennzeichnet,** daß das bewegliche Sperrglied eine Sperrplatte (137) ist; der Anschlagansatz (145A, 145B) und die Rastklinke (155) sich von der Ebene der Sperrplatte (137) erstrecken und bezüglich der Eingriffsoberfläche (143A, 143B) seitlich beabstandet sind und dabei ausgelegt sind, die ersten (131) und dritten (133) Blockierflächen auf den Holmmmitteln (125) zu umgreifen; und das Vorspannmittel eine Feder (157) ist, wobei die Feder (157) eine gewählte Verschiebung dieser starren Platte (137) relativ zu der Aufnahme (113) gestattet.

Revendications

1. Mécanisme de verrouillage (10 ; 110) pour fixer de façon démontable un ensemble (14 ; 114) dans un logement (13 ; 113) prévu dans la paroi (11 ; 111) d'un carter (12 ; 112) de transmission, ledit mécanisme de verrouillage (10 ; 110) comprenant un élément de verrouillage fixe (25 ; 125) qui peut être mis en prise avec un élément de verrouillage mobile (36, 38 ; 137) par une opération consistant à aligner l'élément de verrouillage mobile (36, 38 ; 137) avec l'élément de verrouillage fixe (25 ; 125), à insérer l'élément de verrouillage mobile (36, 38 ; 137) dans l'élément de verrouillage fixe (25 ; 125), puis à faire tourner l'élément de verrouillage mobile (36, 38 ; 137) dans l'élément de verrouillage fixe (25 ; 125) pour mettre l'un de ces éléments en prise avec l'autre, caractérisé en ce que ledit élément de verrouillage fixe comprend des moyens formant pilier (25 ; 125) qui font saillie sur la paroi (11 ; 111) du carter (12 ; 112) de la transmission, en juxtaposition par rapport audit logement (13 ; 113), lesdits moyens formant pilier (25 ; 125) ayant une partie de socle (26 ; 126) et une partie de tête (30 ; 130) qui possède des première (31 ; 131), deuxième (32 ; 132) et troisième (33 ; 133) faces de blocage présentes sur cette partie, lesdites première (31 ; 131) et troisième (33 ; 133) faces de blocage étant espacées latéralement l'une de l'autre, ladite deuxième face de blocage (32 ; 132) étant disposée

perpendiculairement entre lesdites première (31 ; 131) et troisième (33 ; 133) faces de blocage et faisant face audit logement (13 ; 113) à distance de ce logement ; ledit élément de verrouillage mobile comprend un élément de verrouillage (36, 38 ; 137) en forme de plaque retenu sur un ensemble électro-aimant (14 ; 114), au moins une surface de prise (43A, 43B ; 143A, 143B) présente sur ledit élément de verrouillage (36, 38 ; 137) en forme de plaque, au moins un ergot de butée (45A, 45B ; 145A, 145B) faisant saillie vers l'extérieur sur ledit élément de verrouillage (36, 38 ; 137) et au moins un cliquet d'enclenchement (55 ; 155) faisant saillie vers l'extérieur sur ledit élément de verrouillage (36, 38 ; 137), ledit ergot de butée (45A, 45B ; 145A, 145B) et ledit cliquet d'enclenchement (55 ; 155) étant espacés latéralement l'un de l'autre, et ladite surface de prise (43A, 43B ; 143A, 143B) étant disposée entre eux ; et le mécanisme de verrouillage comprend des moyens de sollicitation (50 ; 157) servant à tendre à presser ladite surface de prise (43A, 43B ; 143A, 143B) contre ladite deuxième face de blocage (32, 132) et à permettre de délacer sélectivement ledit élément de verrouillage (36, 38 ; 137) de manière à séparer lesdits moyens de prise (43A, 43B ; 143A, 143B) de ladite deuxième face de blocage (32 ; 132) et, de cette façon, permettre de faire tourner ledit élément de verrouillage (36, 38 ; 137) dans un premier sens ou dans le sens inversé, dans le logement, de manière que ledit cliquet d'enclenchement (55 ; 155) franchisse ladite deuxième face de blocage desdits moyens formant pilier (25 ; 125) sans contact notable avec ceux-ci, de manière à permettre le montage et le démontage de l'ensemble électro-aimant-valve (14 ; 114) par rapport au logement (13 ; 113).

2. Mécanisme de verrouillage selon la revendication 1, caractérisé en ce que lesdits moyens de sollicitation utilisent au moins un doigt élastique (50A, 50B) ; chaque cliquet d'enclenchement (55A, 55B) est porté par un doigt élastique (50A, 50B) respectif ; une configuration de rampe de came (56) est prévue sur chaque cliquet d'enclenchement (55), au moins un bord de frappe (58) est présent sur le carter (12) de la transmission ; et la coopération de chaque configuration de rampe de came (56) avec ledit bord de frappe (58) détermine le déplacement d'un cliquet d'enclenchement (55) respectif lorsqu'on fait tourner l'ensemble à l'électro-aimant (14) suffisamment pour permettre audit élément de verrouillage (36, 38) de se dégager desdites premières (31A, 31B) et deuxième (32A, 32B) faces de blocage jusqu'à ce que lesdits ergots de butée (45A, 45B) soient en prise avec lesdites premières faces de blocage (31A, 31B) et que les cliquets d'enclenchement (55A, 55B) soient en prise avec lesdites troisièmes faces de blocage (33A, 33B).

3. Mécanisme de verrouillage selon la revendication 1, caractérisé en ce que ledit élément de verrouillage mobile est une plaque de verrouillage (137) ; ledit ergot de butée (145A, 145B) et ledit cliquet d'enclenchement (155) font saillie sur le plan de ladite plaque de verrouillage (137) et sont espacés latéralement de ladite surface de prise (143A, 143B), et ainsi adaptés pour encadrer lesdites premières (131) et troisièmes (133) faces de blocage desdits moyens (125) formant pilier ; et lesdits moyens de sollicitation sont constitués par un ressort (157), ledit ressort (157) permettant de déplacer ladite plaque rigide (137) sélectivement en translation par rapport au logement (113).

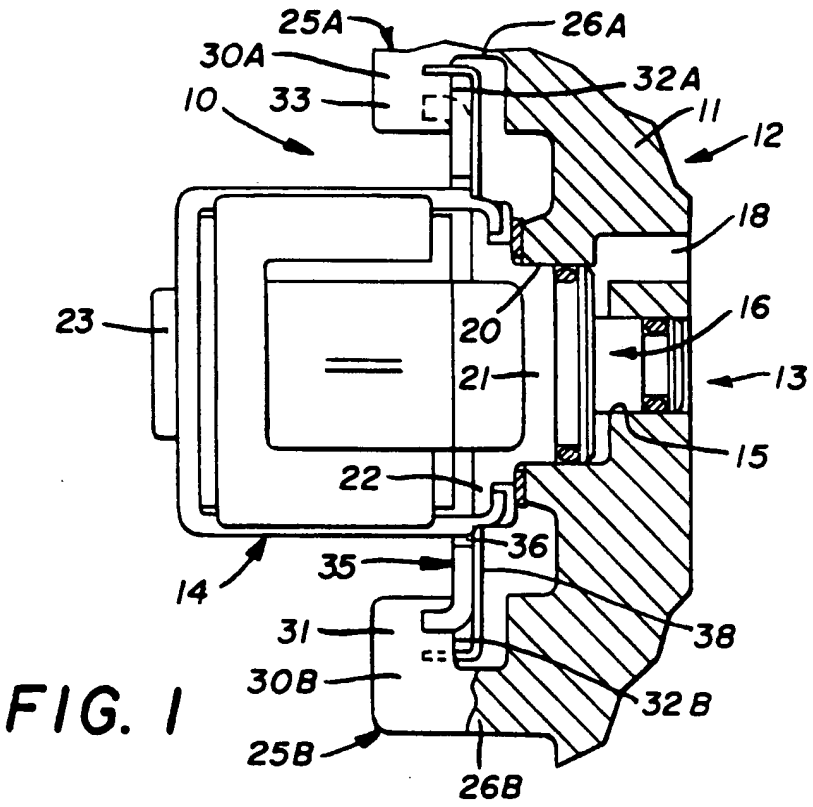
25A
26A
30A
32A
33
10
11
12
18
23
20
16
21
13
15
22
36
35
14
38
31
30B
32B
25B
26B

FIG. 1

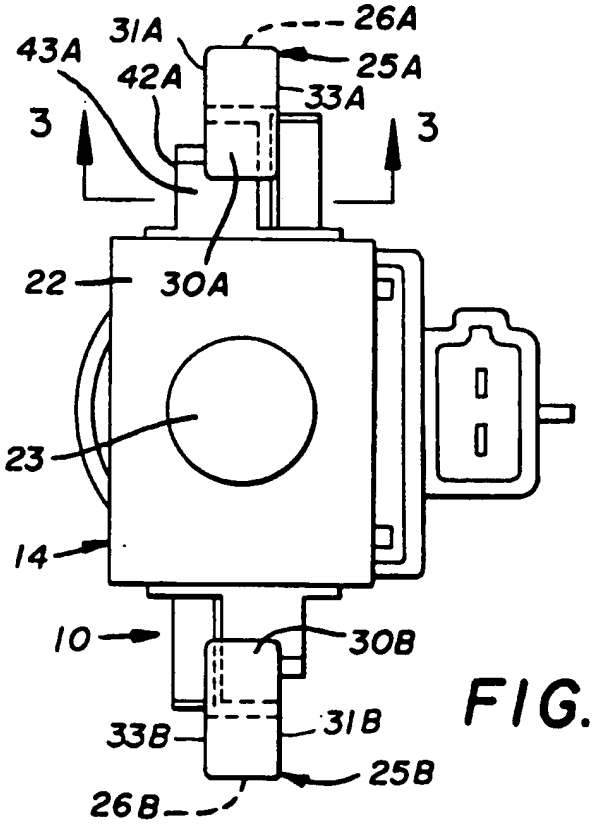
31A
26A
43A
25A
42A
33A
3
3
22
30A
23
14
10
30B
31B
33B
25B
26B

FIG. 2

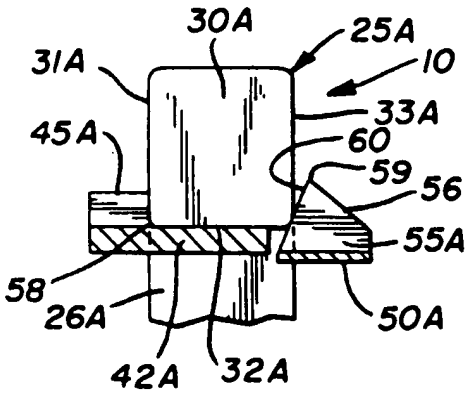

FIG. 3

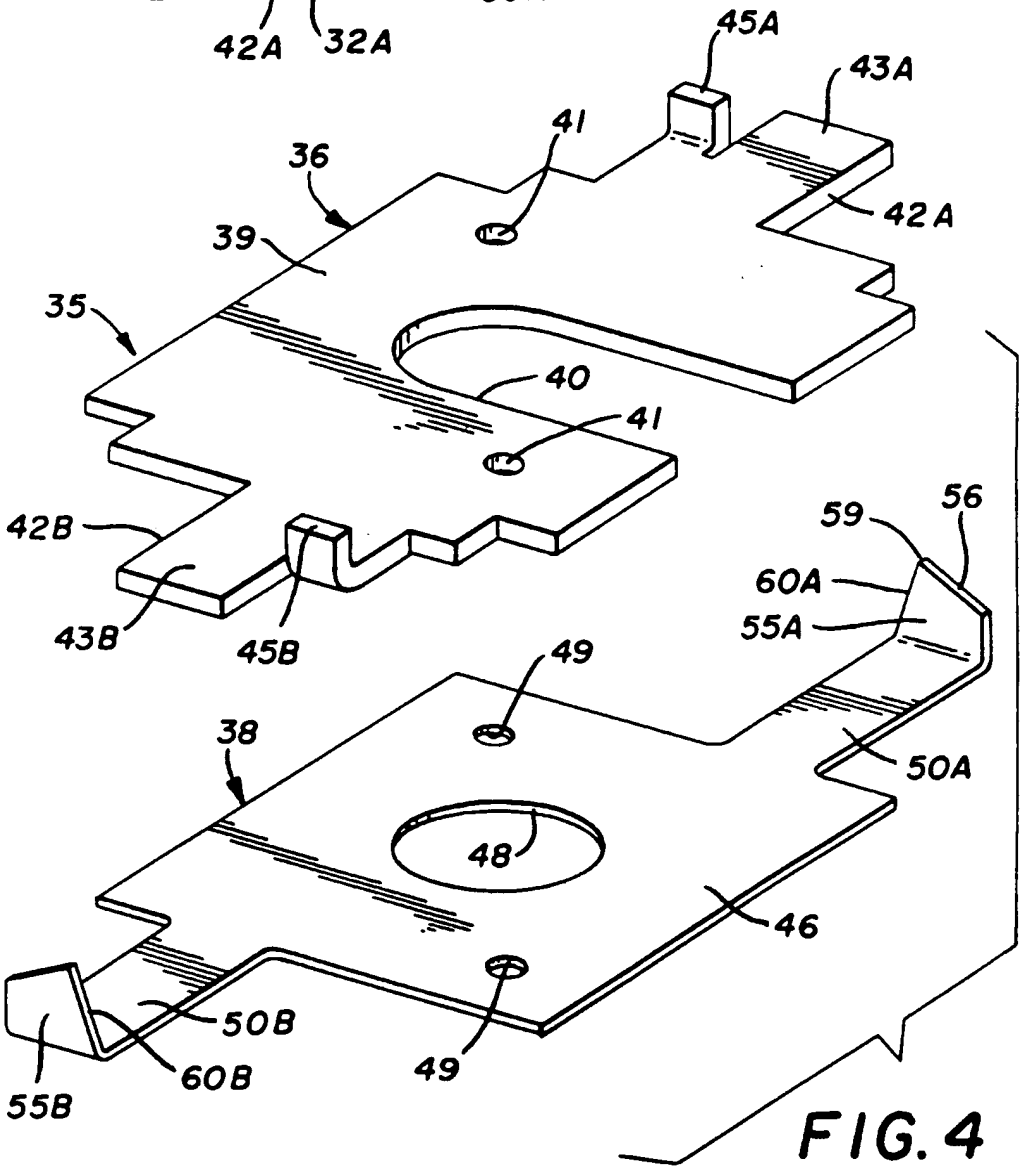

FIG. 4

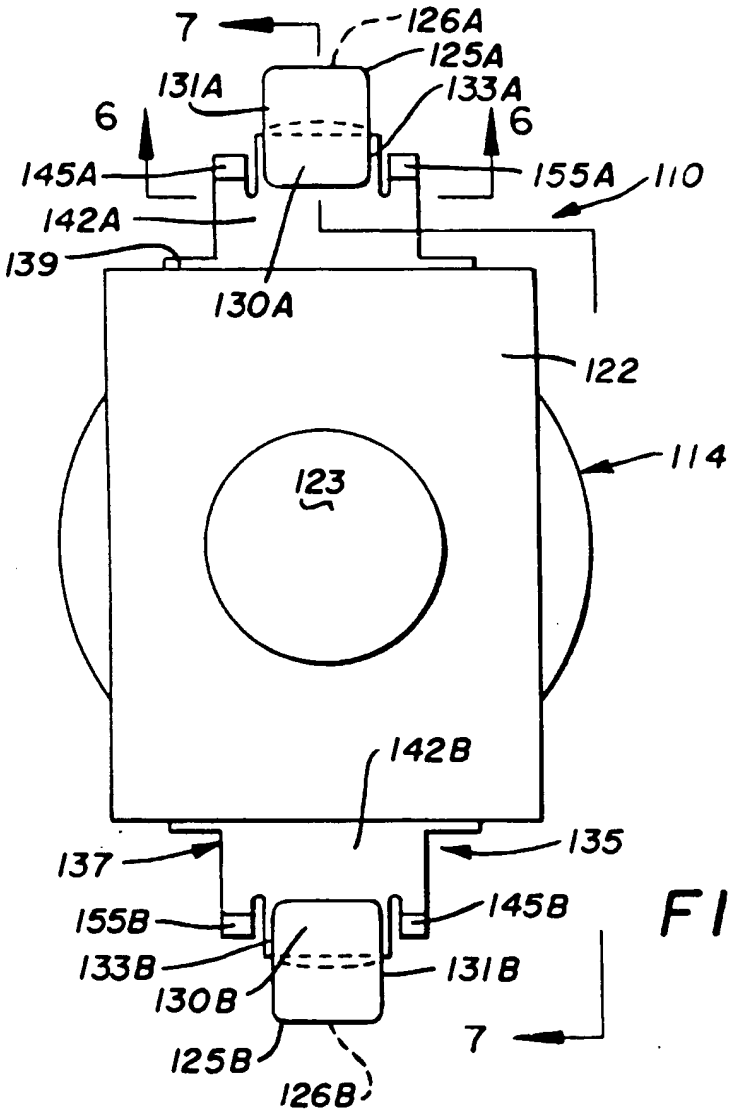
7
126A
125A
131A
133A
6
6
145A
155A
110
142A
139
130A
122
114
123
142B
137
135
155B
145B
133B
131B
130B
7
125B
126B

FIG. 5

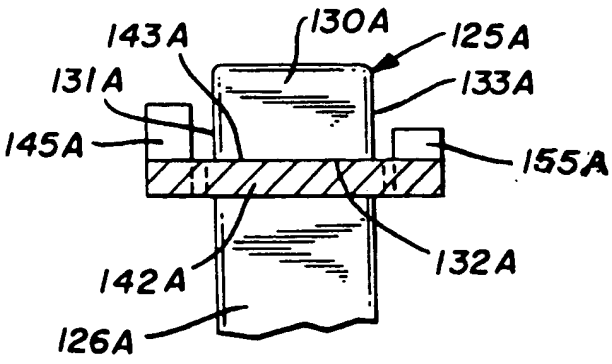
143A
130A
125A
131A
133A
145A
155A
142A
132A
126A

FIG. 6

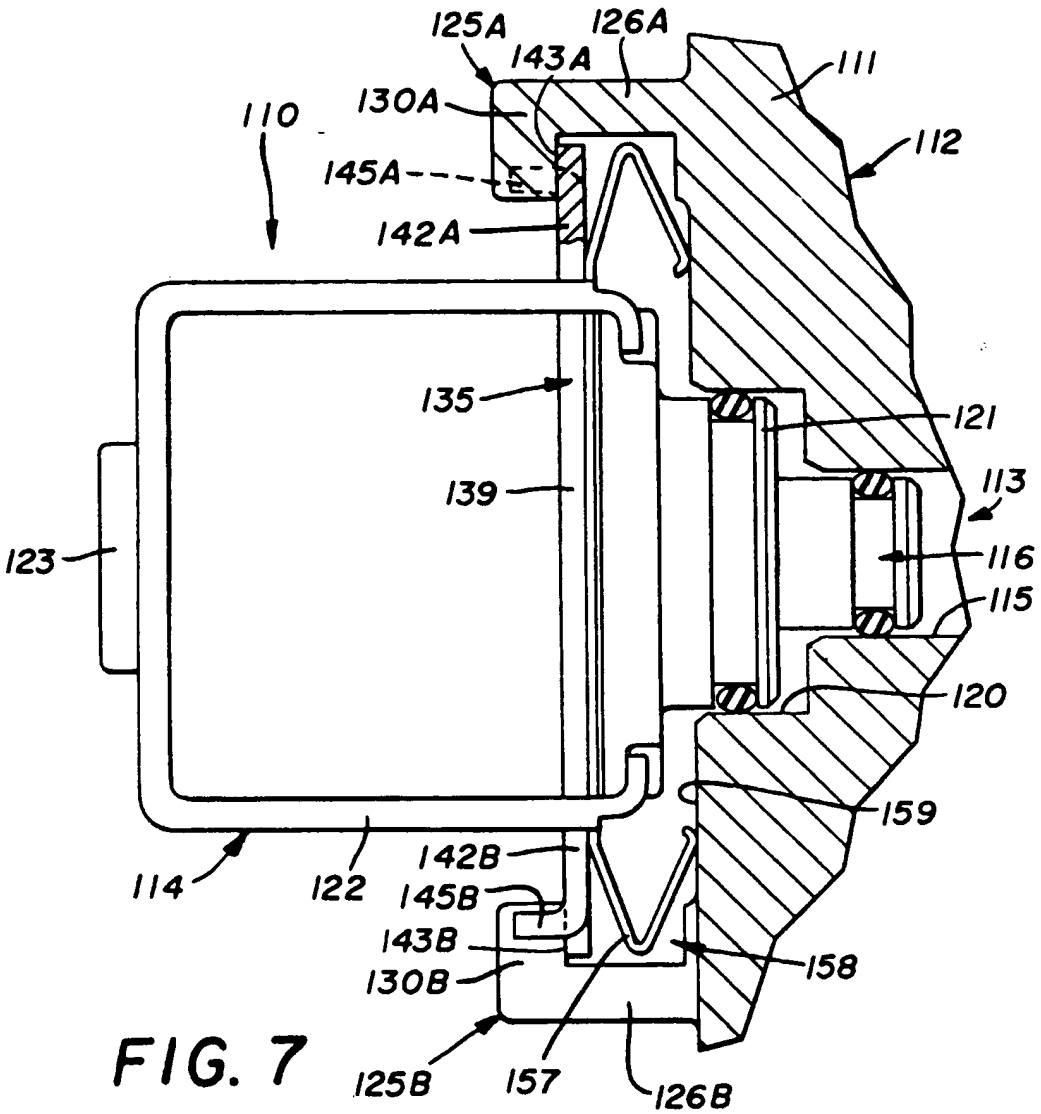
125A
126A
143A
111
110
130A
112
145A
142A
135
121
139
113
123
116
115
120
159
114
122
142B
145B
143B
158
130B
125B
157
126B

FIG. 7